

**Documentation of Environmental Indicator Determination
in Accordance with EPA Interim Final Guidance 2/5/99**

**RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)**

Current Human Exposures Under Control

Facility Name: Douglas County Landfill
Facility Address: 126th & State Streets, Omaha, NE 68134
Facility EPA ID #: NET320010234

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action [e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)], been **considered** in this EI determination?
- ☒ If yes - check here and continue with #2 below.
- ☐ If no - re-evaluate existing data, or
- ☐ If data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EIs developed to date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions [for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)].

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action

program, the EIs are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993 (GPRA). The “Current Human Exposures Under Control” EI is for reasonably expected human exposures under current land- and groundwater-use conditions ONLY and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program’s overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in the RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments or air **media** known or reasonably suspected to be “**contaminated**”¹ above appropriately protective risk-based “levels” (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
a. Groundwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Groundwater monitoring. / VOCs.</i>
b. Air (indoors) ²	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Indoor air monitoring (cartridges, tubes CGI, continuous sample pumps).</i>
c. Surface Soil (e.g., <2 ft)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Soil-gas measurements (OVA, CGI, gas detector tubes).</i>
d. Surface Water	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Upstream/downstream sampling.</i>
e. Sediment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Upstream/downstream sampling.</i>
f. Subsurf. Soil (e.g., >2 ft)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Direct measurements (OVA, CGI, gas detector tubes).</i>
g. Air (outdoors)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Borehole PID readings.</i>

¹ “Contamination” and “contaminated” describes media-containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids that are subject to RCRA) in concentrations in excess of appropriately protective risk-based “levels” (for the media, that identify risks within the acceptable risk range).

² Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggests that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air [in structures located above (and adjacent to) groundwater with volatile contaminants] does not present unacceptable risks.

- ☐ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.
- ☒ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.
- ☐ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

- a. **Groundwater.** Long-term groundwater monitoring, conducted since 1985, indicates that groundwater beneath and slightly downgradient from the facility has had elevated concentrations (above respective MCLs) of seven volatile organic compounds (VOCs) and five metals, listed below:

<u>VOCs:</u>	<u>Metals:</u>
1,2-Dichloroethane	Barium
1,1-Dichloroethene	Cadmium
Tetrachloroethene	Chromium
1,2-Dichloroethene	Nickel
1,1,1-Trichloroethane	Lead
Trichloroethene	
Vinyl Chloride	

A tabulated summary of the historical analytical results for these compounds is included in the **attached Table 1** (sorted by Sample Date, then Field ID) and **attached Table 2** (sorted by Field ID, then Sample Date). The **attached Figure 1** is an area map of the facility and surrounding off-site sampling locations. The **attached Figure 2** is a site map of the facility, showing locations of monitoring wells.

Concentration trends in most wells have decreased over time. The leading edge of the VOC contaminant plume appears to have stalled and does not extend any more than 400 feet beyond the facility's downgradient boundaries, as demonstrated by non-detect monitoring wells that are located beyond the mapped leading edge of the plume.

The horizontal and vertical extents of contamination has been defined. Additional information regarding plume migration is contained in the Environmental Indicator Form CA750 prepared for this facility.

- b. **Air (indoors).** Six occupied dwellings (homes) within 0.25 mile of the facility were sampled in June 1992 for potential vapors within the dwellings. Vapor monitoring included the analysis of hydrogen sulfide (H₂S), methane, and Volatile Organic Compounds (VOCs). Investigation details are provided in attached pages 3-1, 3-2, 4-1,

4-2, 4-3, Figure 4, and Appendix I-3 (attached) which were taken from Summary Document Number 2, December 1998 (SDN2).

None of the six dwellings sampled contained any detectable levels of hydrogen sulfide or methane gases in the indoor air.

*Twelve VOCs (of a target list of 38 VOCs) were detected. See the **attached Table 3** for VOC results and their comparisons to EPA Region IX, Preliminary Remediation Goals (PRGs) for Ambient Air. See **attached Figure 1 from Appendix I-3** for sampling locations.*

None of the detected compounds were found at levels exceeding EPA's protectiveness guidelines, although two, benzene and methylene chloride, were detected at levels exceeding their respective PRGs. Because most of the compounds detected had not been detected in groundwater samples from the facility, and because the gases usually observed emanating from landfills, hydrogen sulfide and methane, were not detected, it was concluded that the detected compounds most likely originated from the dwellings themselves. It is believed that the operation of an active gas extraction system at the landfill since 1995 has reduced the potential for contamination to migrate by means of soil gas, however it is anticipated that indoor air sampling will be performed in the future to ensure this potential exposure pathway is assessed.

- c. **Surface Soil (e.g., <2 ft).** No systematic, direct surface soil sampling has been conducted at the facility because the entire landfill was capped with clean soil. Soil contamination has been indirectly determined from soil-gas measurements (OVA, CGI, gas detector tubes) of borehole cuttings. Nearly all of the boreholes were drilled around the perimeters of the facility. The facility did not report any elevated soil gas readings from the <2 ft. interval of these borings.*
- d. **Surface Water and***
- e. **Sediment.** An unnamed, southwesterly-flowing stream bisects the southeastern quarter of the facility, cutting deeply into the hills and forming a 5-10 foot-deep ravine (shown on attached Figures 1 and 2). Upstream and downstream surface-water stations (labeled "Surf.E" and "Surf.W." in Tables 1 and 2) were established at the two points where the stream enters and exits the facility, have been routinely monitored for VOC's and metals since 1986 (see attached Tables 1 and 2 for analytical results). The owner/operator also performed Appendix IX (volatiles, semi-volatiles, pesticides, and metals) sampling of soils and sediments from these two stations in 1992 and 1994 (see **attached Table 4** for 1994 analytical results); none of the detected compounds exceeded EPA PRGs.*

Analysis of all of the analytical data collected to date indicates that the facility is not negatively impacting surface water and sediments. All contaminant detections were eventually ruled out as a contaminant of concern for any or all of the following reasons: 1) contaminant concentration levels were very low, 2) elevated contaminant

concentrations were not persistent between sampling events, 3) results could not be replicated in duplicate samples, 4) contaminants were found at the highest levels in upstream samples.

- f. **Subsurface. Soil (e.g., >2 ft).** *No systematic, direct surface soil sampling has been conducted at the facility because the entire landfill was capped with clean soil. Soil contamination has been indirectly determined from soil-gas measurements (OVA, CGI, gas detector tubes) of borehole cuttings. Nearly all of the boreholes were drilled around the perimeters of the facility. According to a facility report (SDN2, page 3-5), “elevated OVA and CGI readings were observed at several borings; However, the observed readings were not sustained” The facility also reported that Gas Detector Tubes analysis of high readings could not identify any potential contaminants. Direct examination of the boring logs show only a few trace OVA readings at depth.*
- g. **Air (outdoors).** *This media cannot be reasonably expected to be “contaminated” above appropriately protective risk-based levels. Soil gas readings from borings at the facility boundary were either non-detect, negligible, or not persistent. Most potentially harmful gasses generated within the landfill that could reach the atmosphere are expected to be captured by a landfill gas extraction system that has been operating since 1995.*
3. Are there **complete pathways** between “contamination” and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential Human Receptors (Under Current Conditions)

<u>“Contaminated” Media</u>	Residents	Workers	Day-Care	Construction
Groundwater	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>
<u>“Contaminated” Media</u>	Trespassers	Recreation	Food ³	
Groundwater	<u>No</u>	<u>No</u>	<u>No</u>	

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strikeout specific Media including Human Receptors’ spaces for Media which are not “contaminated”) as identified in #2 above.
2. Enter “yes” or “no” for potential “completeness” under each “Contaminated” Media - Human Receptor combination (Pathway).

³ Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- ☒ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- ☐ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.
- ☐ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

In the late 1980's, 15 water-supply wells that were identified within 0.5 miles of the facility were sampled for evidence of contamination (see attached Figure 1). Two of these wells (Rix House and Rix Livestock No. 1) were found to contain VOCs and metals above either background levels or Drinking Water Standards, so they were taken out of service in 1989 and subsequently replaced (at new locations) with new wells. Since 1995, the owner/operator has conducted routine groundwater monitoring of those off-site water supply wells considered to be the most vulnerable to contamination; analytical results from this monitoring indicate that these wells have never been contaminated.

Beyond the 15 water-supply wells already identified and monitored, there are no other known users of groundwater within or adjacent to areas of known impact. The facility itself does not have a water-supply well. A fence with a locked gate or a manned guard shack restricts access to the site. No construction is anticipated with current land use that would result in worker exposure to the contaminated groundwater. A landfill cap overlies the source area. Workers employed by the facility do not perform activities that would bring them into contact with contaminated groundwater. There are no recreation activities within, or adjacent to, areas of known impact. No agricultural land-use areas are located within, or adjacent to, areas of known impact and, therefore, no pathways/receptors to food are known to exist.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be "**significant**"⁴ (i.e., potentially "unacceptable" because

⁴ If there is any question or whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training, and experience.

exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

_____ If no (exposures cannot be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s): Not applicable.

5. Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

_____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s): Not applicable.

Facility: Douglas County Landfill

CA725

Page 8 of 8

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

☒ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Douglas County Landfill facility, EPA ID # NET320010234, located at 126th & State Streets, Omaha, Nebraska under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

☐ NO - "Current Human Exposures" are NOT "Under Control."

☐ IN - More information is needed to make a determination.

Completed by: (Signature) Original signed by _____ Date 9/30/02 _____
Wray Rohrman
Environmental Scientist

Supervisor: (Signature) Original signed by _____ Date 9/30/02 _____
(Print) John Smith
(Title) Manager, RCRA Corrective Action and Permits Branch
(EPA Region or State) EPA Region 7

Locations where References may be found:

Nebraska Department of Environmental Quality

U.S. EPA Region VII Records Center, 901 North 5th Street, Kansas City, KS 66101

Douglas County Environmental Services, 3015 Menke Circle, Omaha NE 68134

Contact telephone and e-mail numbers

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Final Note: The Human Exposures EI is a Qualitative Screening of exposures and the determinations within this document should not be used as the sole basis for restricting the scope of more detailed (e.g., site-specific) assessments of risk.

ref: ca725epa.doc